

Testimony of  
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**On Reauthorization of the Magnuson-Stevens (Sustainable Fisheries) Act**

Before the Subcommittee on Oceans and Fisheries of the Senate Committee on Commerce, Science  
and Transportation

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Madam Chair and members of the Subcommittee, thank you for inviting me to testify before you today on issues related to the reauthorization of the Sustainable Fisheries Act (SFA). For the record, my name is David Sampson and I am an Associate Professor of Fisheries at Oregon State University. My work includes preparing stock assessments for the Pacific Fishery Management Council (PFMC) on behalf of the Oregon Department of Fish and Wildlife, and conducting research on the accuracy of stock assessment methods, sponsored by the Oregon Sea Grant College Program. Also, I was a member of the National Research Council's Committee to Review Individual Fishing Quotas and for six years (1993-98) I served the PFMC as an at-large member of its Scientific and Statistical Committee. You have asked me to testify on the impact of the SFA on fisheries in the Pacific Northwest and to make recommendations for the reauthorization of the Act. I will focus my testimony primarily on the use of stock assessments and scientific data in fisheries management, but, as requested, I will also comment on the use of observers and on the essential fish habitat provisions of the Act.

**Stock Assessments and Scientific Data in Fisheries Management**

The two main problems confronting fisheries managers are determining acceptable levels of harvest and crafting regulations that will achieve those levels. Setting regulations is an especially difficult task because almost all regulations tend to favor one group of fishers over another. Political maneuvering to influence the regulations often is very intense. Because I have no expertise in fisheries regulations I will

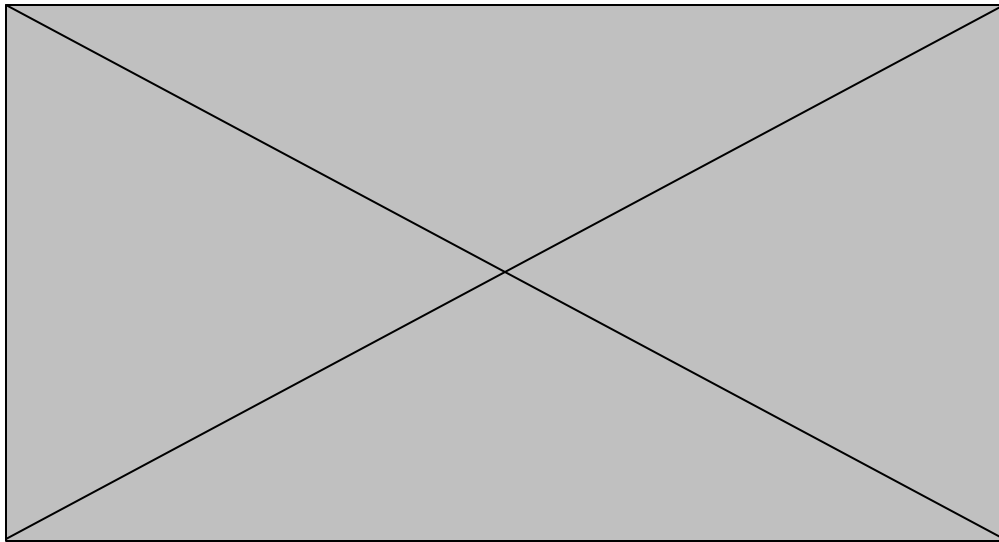
confine my testimony to issues related to determining target levels for harvest.

Stock assessments provide fishery managers with basic information regarding the status of exploited fish stocks, whether they are increasing or decreasing and why. Many stocks are managed on the basis of annual harvest quotas. The quota for a stock is usually derived from the estimated current exploitable biomass and the estimated target fishing rate. Projections of future harvests can be made if the strength of incoming year-classes (the recruits) can be estimated or assumed. These estimates, of current biomass, the target fishing rate, and future recruitment, are subject to considerable uncertainty. Marine organisms are difficult to observe and reliably monitor and they are often subject to variable environmental factors over which Man has no control. Fishery managers aim to maintain the fish stocks and the fisheries that exploit those stocks, but they generally have imperfect information on the conditions of the stocks and dull instruments with which to affect the stocks.

In general there are two primary sources for the data that are used in a stock assessment. One set of data comes from scientific surveys of the stock; the other comes from the fishers, either in the form of landing receipts and logbooks, or from scientific sampling of the landed catch. With a relatively long-lived organism assessment scientists often use a "catch-at-age analysis" to reconstruct the demographic history of the stock. This type of analysis provides the estimate of the current exploitable biomass on which the harvest quota is based. The analysis attempts to account for temporal changes in stock abundance based on landings and age composition data series from the fishery, coupled with stock size and age composition data series from the scientific surveys. Assessment scientists use a second type of analysis, usually a "yield-per-recruit" or "spawning-biomass-per-recruit" analysis, to derive the target fishing rate, the other key ingredient for calculating the harvest quota. These analyses use estimates of growth, mortality and maturity to gauge the impact of different fishing rates on the productive capacity of the stock.

In response to the new guidelines for the National Standards established in the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, the Pacific Fishery Management Council amended its Pacific Coast Groundfish Fishery Management Plan. The Council adopted new definitions for "overfishing", "overfished", and "optimum yield", and established new procedures for setting annual harvest quotas. The new procedures, illustrated in the diagram below, are

considerably more complex than the previous ones and, in my view, they place unrealistic demands on fisheries science.

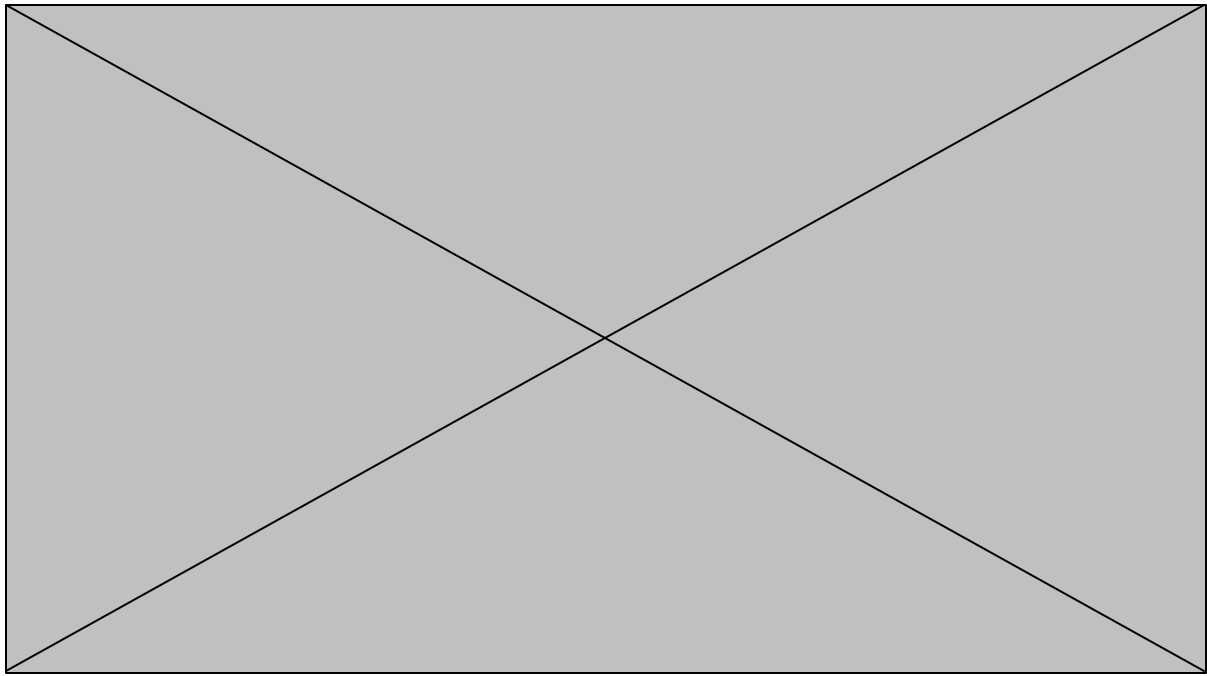


The primary change in the procedure for setting the "optimum yield" quota was the addition of two thresholds. If a stock is greater than 40% of its unfished size, then the quota is the product of the current stock size times the target fishing rate ( $F_{MSY}$ , the fishing rate that produces the maximum

sustainable yield, MSY). If a stock drops below 40% of its unfished size, the target fishing rate is set below the  $F_{MSY}$  level and the quota is reduced proportionately. If a stock drops below 10% of its unfished size, the target fishing rate is reduced to zero.

It is entirely appropriate that fish stocks be managed more conservatively when they are at low levels. Compared to the Council's old harvest policy (indicated in the diagram by the dashed line), the new policy will more rapidly rebuild an overfished stock to levels that will support larger and less variable harvests. However, it is extremely problematic to implement this engineering approach to harvest policy because of our general inability to provide reliable estimates of current and unfished stock size. We do not have a stable measure to gauge whether a stock is overfished. Similar problems arise with thresholds based on an MSY stock size level. Also, for many of our West Coast stocks there are inadequate data available to estimate the current stock size, let alone the unfished stock size.

Estimates of fish stock size are inherently imprecise. Consider, for example, estimates of stock size from recent assessments of a West Coast stock of yellowtail rockfish.



The stock size series estimated by the 1996 assessment was dramatically different from the 1993 assessment and it indicated that significant reductions were needed in the annual harvest quota. The assessment was redone in 1997 and the estimates of stock size and the harvest quotas essentially returned to the levels estimated in the 1993 assessment. There have been similar dramatic changes in our perceptions of stock status with several other West Coast stocks.

Part of the instability of West Coast stock assessments is due to a general lack of reliable long-term survey and fishery data series. For example, the trawl survey estimates of rockfish stock size are highly imprecise, with large coefficients of variation (50% or larger). Furthermore, the surveys are only conducted every third summer.

Even with thorough long-term stock monitoring and top-quality stock assessment science our perceptions of stock status can be highly inaccurate. Pacific halibut off Alaska and British Columbia and Northern cod in Atlantic Canada provide recent examples of stocks that have been extensively monitored and studied, and yet retrospective analyses have uncovered dramatic errors in assessments' estimates of stock size. In the case of Pacific halibut, assessments conducted in the mid 1990s estimated the stock size for Area 3A at about 130,000 tons in 1989, compared to the 80,000 tons underestimated by the 1989 assessment. The reverse type of error occurred with Northern cod. Stock assessments conducted during the early 1980s overestimated stock size by a factor of two compared to estimates for the same period from later assessments. The consequence for Northern cod was overfishing, stock collapse, and the closure of what had been a highly productive and stable fishery.

The harvest quota system that has developed as the result of the 1996 Sustainable Fisheries Act is unrealistically complicated given the level of accuracy that we can reasonably expect from our stock assessments. We need to develop fishery control systems that have simple data requirements and that are robust to data errors.

## **Observer Programs**

The Pacific Fishery Management Council does not currently have any observer programs. The Oregon Department of Fish and Wildlife, in cooperation with the Oregon Trawl Commission and the Pacific States Marine Fisheries Commission, has for several years operated a limited program with volunteer

trawl vessels fishing from ports in Oregon. An observer program could provide information on the bycatch of fish that currently are discarded at sea. Some of these discards occur because the fish are unmarketable, some because they are prohibited species (e.g., salmon and halibut in the trawl fishery), and some because of the system of trip limits that the Council uses to slow the pace of fishing and thereby maintain year-round fisheries. West Coast stock assessments generally attempt to account for these at-sea discards but do so without any current data. Better information on discards would undoubtedly improve the quality of our stock assessments, but so too would better survey or age-composition data.

Instituting an observer program to monitor at-sea discards seems an extraordinary way to handle the wastage of marketable fish. Counting how many fish are thrown overboard draws our attention to the problem but does little to solve it. Trawl fishers discard their catches of salmon and halibut because the law requires them to do so. All of the discarded salmon and half or better of the discarded halibut do not survive the experience. The trawl fishers are no better off as a result of this practice, nor are the salmon and halibut fishers, nor are the stocks of salmon and halibut, nor is the general public. Why can't we have a system that allows trawl fishers to buy the rights to take incidental harvests of salmon and halibut, rather than forcing the fish to be discarded at sea? The fish would not be wasted, the salmon and halibut fishers could be compensated for their lost fishing opportunities, and the public would enjoy additional fish in the market. Similarly, discarding of marketable fish due to trip limits could largely be eliminated if fishers were permitted to trade and stack fishing permits to cover their trip limit overages, a practice that is currently banned because of the SFA prohibition against individual fishing quotas.

### **Essential Fish Habitat**

All organisms require suitable habitat for their continued existence and successful reproduction. For many marine organisms the habitat requirements vary as the organisms grow through their various life stages. Defining on a scientific basis that a particular habitat is essential for the survival of a given organism is extremely difficult, except when done in very general terms. For many marine fishes along the West Coast spawning occurs over a broad geographic range and the larval fish drift in the plankton

for several months. During this interval the waters in which the larvae reside are essential to their continued existence. Given that there is a myriad of commercially important fish species along the West Coast leads to the conclusion that the entire expanse of the territorial sea and beyond is essential fish habitat. Such a broad definition seems likely to have little practical importance.

With regard to possible detrimental effects of fishing gear on the long-term productivity of the ecosystem, little information is available. Given the generally high degree of natural variability in the marine upwelling ecosystem off the West Coast, it seems likely that long term studies will be required to establish conclusively whether or not the various types of fishing gear have more than just a transitory effect on bottom habitats.

Madame Chair, this concludes my testimony. Thank you for inviting me to speak to you today.